

REMARKS

This Amendment is submitted in response to the Office Action, dated December 12, 2006. Claims 1-26 are presently pending in the above-identified patent application. Claims 1, 23, and 25 are proposed to be amended herein. No new matter has been introduced. Support for the amendment can be found, for example, on page 1, lines 14-15, and page 12, line 23-25, of the specification.

In the Office Action, the Examiner rejected claims 1-6, 8, 10, 11, 23 and 25 under 35 U.S.C. §103(a) and 103 as being allegedly unpatentable over Rigoutsos et al (1998) (hereinafter "Rigoutsos") taken with IUPAC-IUB Joint Commission of Biochemical Nomenclature (1983) (hereinafter "JCBN"). The Examiner rejected claim 5 under 35 U.S.C. §103(a) as being allegedly unpatentable over Rigoutsos taken with JCBN, in further view of Stormo (January 2000) (hereinafter "Stormo"). The Examiner also rejected claims 9 and 12 under 35 U.S.C. §103(a) as being allegedly unpatentable over Rigoutsos taken with JCBN, in further view of Wu et al. (March 2000) (hereinafter "Wu").

The comments of the Examiner in forming the rejections are acknowledged and have been carefully considered.

The Examiner rejected claims 1-6, 8, 10, 11, 23 and 25 under 35 U.S.C. §103(a) as being allegedly unpatentable over Rigoutsos taken with JCBN. Applicants respectfully assert that the amendment to claims 1, 23 and 25 overcomes the rejection. Support for the amendment can be found, for example, on page 1, lines 14-15, and page 12, line 23-25, of the specification.

On page 4 of the Office Action, the Examiner asserted that

Rigoutsos does not describe the limitation of "and at least one of the positions comprise one symbol of a specified plurality of symbols, wherein the specified plurality of symbols consist of at least two symbols and no more than...available symbols in a set." It ... would have been obvious to... apply the new algorithm by Rigoutsos to include in the alphabet of residues B for aspartic acid or asparagines (at least two symbols), X for unknown or other amino acid, or Z for glutamic acid or glutamine as described by JCBN.

In light of the amendment to independent claims 1, 23 and 25, Applicants submit that there is no motivation to combine Rigoutsos with JCBN so as to include the symbols of B for

aspartic acid or asparagines, or Z for glutamic acid or glutamine, as suggested by the Examiner. Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so. *In re Kahn*, 441 F.3d 977, 986, 78 USPQ2d 1329, 1335 (Fed. Cir. 2006).

5 As stated on page 12, lines 23-25, of the specification,

[e]ach sequence is a series of symbols from an alphabet. For proteins, one can denote by Σ the alphabet of all amino acids; i.e., $\Sigma = \{A, C, D, E, F, G, H, I, K, L, M, N, P, Q, R, S, T, V, W, Y\}$

10 It is to be appreciated that one skilled in the art would recognize that symbols A, C, D, E, F, G, H, I, K, L, M, N, P, Q, R, S, T, V, W and Y represent alanine, cysteine, aspartic acid, glutamic acid, phenylalanine, glycine, histidine, isoleucine, lysine, leucine, methionine, asparagine, proline, glutamine, arginine, serine, threonine, valine, tryptophan and tyrosine, respectively. As a result, amended independent claims 1, 23 and 25 do not include the
 15 limitation of the symbol of B for aspartic acid or asparagines or Z for glutamic acid or glutamine, and therefore Applicants submit that there is no motivation to combine the references. Consequently, because there is no motivation to combine JCBN with Rigoutsos, Applicants respectfully assert that each claim limitation of independent claims 1, 23 and 25 is not taught or suggested by Rigoutsos.

20 To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). As noted by the Examiner on page 4, paragraph 10, of the outstanding Office Action,

25 Rigoutsos does not describe the limitation of “and at least one of the positions comprise one symbol of a specified plurality of symbols, wherein the specified plurality of symbols consist of at least two symbols and no more than available symbols in a set.”

Therefore, Applicant submits that because neither Rigoutsos nor JCBN teach or
 30 suggest discovering a plurality of patterns common to a plurality of the sequences, wherein each pattern comprises a plurality of positions, at least one of the positions comprise one symbol of a specified plurality of symbols, wherein the specified plurality of symbols consists of at least two symbols and no more than $|\Sigma| - 1$ symbols, wherein $|\Sigma|$ is a number of

available symbols in a set of amino acids, and wherein Σ consists of A, C, D, E, F, G, H, I, K, L, M, N, P, Q, R, S, T, V, W and Y, claims 1, 23 and 25 of the present invention are patentable over Rigoutsos taken with JCBN.

Furthermore, if an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). As such, Applicants respectfully request reconsideration and withdrawal of the rejection of claims 1-6, 8, 10, 11, 23 and 25 over Rigoutsos taken with JCBN.

The Examiner rejected claim 5 under 35 U.S.C. §103(a) as being allegedly unpatentable over Rigoutsos taken with JCBN, in further view of Stormo. Applicants respectfully assert that the amendment to claim 1 overcomes the rejection. On page 7 of the Office Action, the Examiner asserted that

it would have been obvious to one of ordinary skill in the art to make and use the method and system described by Rigoutsos with the adding in new ones at each iteration described by Stormo

Applicants submit that by virtue of its dependence on amended independent claim 1, shown above to be nonobvious over Rigoutsos taken with JCBN, claim 5 recites patentable subject matter in its own right. If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

Furthermore, neither Rigoutsos nor JCBN nor Stormo teach or suggest discovering a plurality of patterns common to a plurality of the sequences, wherein each pattern comprises a plurality of positions, at least one of the positions comprise one symbol of a specified plurality of symbols, wherein the specified plurality of symbols consists of at least two symbols and no more than $|\Sigma|-1$ symbols, wherein $|\Sigma|$ is a number of available symbols in a set of amino acids, and wherein Σ consists of A, C, D, E, F, G, H, I, K, L, M, N, P, Q, R, S, T, V, W and Y. Therefore, Applicants respectfully request withdrawal of the rejection.

The Examiner also rejected claims 9 and 12 under 35 U.S.C. §103(a) as being allegedly unpatentable over Rigoutsos taken with JCBN, in further view of Wu. Applicants respectfully assert that the amendment to independent claim 1 overcomes the rejection. Beginning on page 7, paragraph 21, of the Office Action, the Examiner asserted that

one or ordinary skill in the art at the time of the invention would have been motivate Wu to improve the algorithm of Rigoutsos to increase the speed of sequence analysis.

5 Applicants respectfully assert that by virtue of its dependence on amended independent claim 1, shown above to be nonobvious over Rigoutsos taken with JCBN, claims 9 and 12 recite patentable subject matter in their own right. If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

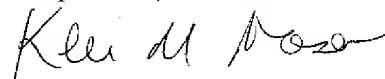
10 Furthermore, neither Rigoutsos nor JCBN nor Wu teach or suggest discovering a plurality of patterns common to a plurality of the sequences, wherein each pattern comprises a plurality of positions, at least one of the positions comprise one symbol of a specified plurality of symbols, wherein the specified plurality of symbols consists of at least two symbols and no more than $|\Sigma| - 1$ symbols, wherein $|\Sigma|$ is a number of available symbols in a
15 set of amino acids, and wherein Σ consists of A, C, D, E, F, G, H, I, K, L, M, N, P, Q, R, S, T, V, W and Y. Therefore, Applicants respectfully request withdrawal of the rejection.

All of the pending claims, i.e., claims 1-26, are in condition for allowance and such favorable action is earnestly solicited.

20 If any outstanding issues remain, or if the Examiner has any further suggestions for expediting allowance of this application, the Examiner is invited to contact the undersigned at the telephone number indicated below.

The Examiner's attention to this matter is appreciated

Respectfully submitted,



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